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IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his)
capacity as ATTORNEY GENERAL)
OF THE STATE OF OKLAHOMA and)
OKLAHOMA SECRETARY OF THE)
ENVIRONMENT C. MILES TOLBERT,))
in his capacity as the)
TRUSTEE FOR NATURAL RESOURCES)
FOR THE STATE OF OKLAHOMA,)
)
Plaintiff,)
)
vs.) 4:05-CV-00329-TCK-SAJ
)
TYSON FOODS, INC., et al,)
)
Defendants.)

- - - - -

VOLUME I OF THE VIDEOTAPED
DEPOSITION OF ROGER OLSEN, PhD, produced as a
witness on behalf of the Defendants in the above
styled and numbered cause, taken on the 10th day of
September, 2008, in the City of Tulsa, County of
Tulsa, State of Oklahoma, before me, Lisa A.
Steinmeyer, a Certified Shorthand Reporter, duly
certified under and by virtue of the laws of the
State of Oklahoma.

1 including expenses?

2 A I have not updated that since my -- or looked
3 at that since my last testimony.

4 Q I believe if I recall correctly, and you
5 correct me if I'm wrong on this, that in January you 09:04AM
6 indicated that CDM had been paid, you believed, in
7 excess of 8 million dollars; does that sound about
8 right?

9 A That's about right, yeah.

10 Q I assume that your firm has continued to work 09:04AM
11 on the case since January; is that true?

12 A That's true.

13 Q You've written a report that is in front of
14 you on the table today; is that correct?

15 A Yes, I have. 09:05AM

16 Q Okay. You just don't have an estimate as to
17 today what the total billing would have been from
18 your firm to the South Carolina law firm of Motley
19 Rice?

20 A No. 09:05AM

21 Q Dr. Olsen, you gathered considered materials,
22 file materials and produced them to Mr. Page in
23 connection with your work in this case; is that
24 correct?

25 A To Mr. Page and Motley Rice attorneys. 09:05AM

1 Q Let's go there. We'll see how long it takes.

2 I believe it begins on Page 632, Dr. Olsen.

3 A Yes, sir.

4 Q Okay. Run me through there and tell me which

5 portions you wrote versus which portions -- 09:29AM

6 A I wrote the introduction.

7 Q Okay. 6.11-1?

8 A I wrote 6.11 dash -- 6.11.2, Steps.

9 Q Steps of PCA?

10 A Right. Well, the first part of it, and then 09:29AM

11 he -- I actually wrote the first step but I was

12 pulling from various pieces he gave me. Like Step

13 6, he wrote essentially all of that and I pulled it

14 in and put it in the first shot at this whole

15 section. So that's describing the databases and 09:30AM

16 everything he wrote.

17 Q Let me ask this question while we're on it,

18 Dr. Olsen.

19 A Sure.

20 Q The source material for the steps of the PCA 09:30AM

21 process came from Dr. -- or from Mr. Chappell; is

22 that right?

23 A No.

24 Q Did I not?

25 A No.

1 principal components under six different rotations,
2 so we have actually have -- for every run I did,
3 there should be 25 to 30 lists of scores for every
4 sample.

5 Q Okay, but just as a function of the way the 05:03PM
6 software works, you're always going to get a
7 Principal Component 1 score and a Principal
8 Component 2 score; you may get other scores as well;
9 right?

10 A The total software, that's what we're 05:03PM
11 generating, a Principal Component 1 score and a
12 Principal Component 2 score for individual samples.

13 Q So there's nothing magical about the fact that
14 when you feed data into the software program, you
15 get a score that's called Principal Component Score 05:03PM
16 1 and Principal Component Score 2?

17 A That's correct.

18 Q Dr. Olsen, if I understand correctly, you
19 believe that the results of your principal component
20 analysis on water samples has identified two primary 05:03PM
21 principal components as explaining the variations
22 that you see in the chemical compositions of the
23 water samples; correct?

24 A The majority of the variations.

25 Q Okay. For purposes of your principal 05:04PM

1 component analysis work in this case and your
2 opinions about the source of contamination in
3 particular samples, do I understand correctly that
4 you've concluded that all samples with a Principal
5 Component 1 score of greater than 1.3 are in your
6 opinion impacted predominantly by poultry litter?

05:04PM

7 A There may be a few minor exceptions in there.
8 I'd have to go review it. There's some question
9 about the CP samples that we collected this morning,
10 so, you know, that needs further analysis. So
11 there's -- and a few samples I couldn't verify
12 locations of so I kind of excluded them, so there's
13 a very, very few, but generally that statement is
14 true.

05:04PM

15 Q Well, Dr. Olsen, in your report you said that
16 a Principal Component 1 score of 1.3 or greater is
17 consistent with and supports your opinion that that
18 sample reflects contamination from poultry litter;
19 is that right?

05:05PM

20 A Yeah, and I need to clarify that a little bit
21 more. There were some -- in that particular count,
22 I included inadvertently some of the wastewater
23 treatment plant discharges, so I need to take that
24 out of those percentages and analysis.

05:05PM

25 Q I didn't really ask about percentages so I'm

05:05PM

1 confused as to exactly what you are talking about.

2 What are you talking about?

3 A There were three wastewater treatment samples
4 that were scored and typically those had a principal
5 component score of above 1.3, and I would say that
6 those probably weren't contaminated by poultry.

05:05PM

7 Q Which three wastewater treatment plant
8 facilities are you referring to or samples?

9 A There was one from Siloam Springs, I think
10 from Rogers -- you want me to look that up for sure?

05:06PM

11 Q Sure.

12 A Siloam Springs.

13 Q What are you referring to, Dr. Olsen?

14 A Oh. Table 6.11-11.

15 Q 6.11-11?

05:07PM

16 A Yes.

17 Q Okay. Now, I don't have a Table 6-11.

18 A 6.11-11?

19 Q I don't have that.

20 A Largest PC2 scores and locations.

05:07PM

21 Q I missed a copy in my set. Can I look off of
22 yours?

23 A Sure.

24 Q All right. Which wastewater treatment plant
25 samples are you referring to?

05:07PM

1 A There's a Siloam Springs wastewater treatment
2 plant discharge.

3 Q On March 31st of 2008?

4 A Yes.

5 Q Okay. 05:08PM

6 A You need to see that, too, David?

7 MR. PAGE: I'm just going to look over your
8 shoulder. Thank you.

9 A There's one.

10 Q Could you put a star by the one you are 05:08PM
11 identifying?

12 A This is an exhibit, isn't it?

13 Q It is, yes, sir.

14 A Okay. Springdale is the next one.

15 Q And for the Record, that's Springdale 05:08PM
16 wastewater treatment plant, also collected on March
17 31st of 2008; is that right?

18 A Yes.

19 Q Okay. Now, are those the only two?

20 A No. There's three. Rogers wastewater 05:08PM
21 treatment plant.

22 Q Okay, and for the Record, you've identified
23 the sample collected from Rogers on April 1st of
24 2008; correct?

25 A Yes. 05:08PM

1 Q Okay. Those are the only three you are
2 referring to?

3 A Yeah. We collected a Lincoln sample but it
4 was not a discharge sample. It was actually in the
5 stream downgradient. Even though it's identified as 05:09PM
6 a wastewater treatment plant, it was actually in a
7 stream downgradient, so it's actually a stream
8 sample.

9 Q Okay, and, Dr. Olsen, if I understand your
10 earlier comments, the three samples that you've just 05:09PM
11 identified, which are effluent from wastewater
12 treatment plants, had PC1 scores in your analysis
13 above 1.3; is that right?

14 A Yes, PC1 scores, yes.

15 Q All right, and 1.3 has a score for PC1 is the 05:09PM
16 value you are using to identify a surface water
17 sample as predominantly contaminated by poultry
18 waste; correct?

19 A No. That's the difference, and that's what I
20 need a little bit of clarity in my text. These are 05:09PM
21 not -- even though they have a score above 1.3, they
22 are not in the circle that's dominated by poultry
23 waste because they have a higher -- see, they have
24 these high, very high PC2 scores, so it puts them
25 out of that dominant field. 05:10PM

1 Q Okay. I'm sorry. Go ahead.

2 A So there's -- what I'm just trying to do is
3 clarify the text there when I said that anything
4 above 1.3 had poultry contamination of the PC score.

5 As you see, that's probably not true, and so I'm 05:10PM
6 just trying to clear that up, and these are three
7 examples, but the ones that are dominated are
8 definitely identified.

9 Q Well, what is the criteria as clear as you can
10 state it as of today in terms of PC1 and PC2 scores 05:10PM
11 for you to offer an opinion that a particular sample
12 is predominantly impacted by poultry waste?

13 A To make that contrast, I need to determine a
14 range of both PC1 and PC2, and those are on my
15 circles of my photograph, and I can tell you that by 05:11PM
16 looking at it.

17 Q Let's do it because I want to get the
18 criterion standards down before we get too far into
19 this. It's figure 6.11-18C I think is what you are
20 referring to, Dr. Olsen. 05:11PM

21 A Yeah, it's 6.11-18C.

22 Q Let me get there. Okay. Dr. Olsen, tell us
23 what are the range of PC1 and PC2 scores that you
24 need to see in your principal component analysis to
25 identify a particular sample as being predominantly 05:12PM

1 A Yes. All the other samples within the circle
2 are predominantly in my opinion --

3 Q How do you know that?

4 A -- dominated by poultry waste impact. Because
5 I've done an analysis of where they are in the basin 05:20PM
6 and, again, this is a very definitive analysis of
7 poultry waste impact in my opinion. Two samples
8 that were potentially not representative from a cow
9 pasture that may be impacted by, you know,
10 groundwater or springs and other things that have 05:20PM
11 poultry do not make me change any opinion about
12 that's the dominant field for poultry.

13 Q Dr. Olsen, you said you're confident that
14 those other samples are impacted by poultry waste,
15 the other samples in close proximity to the cow 05:21PM
16 pasture?

17 A Yeah, several of them all within the circle.

18 Q Okay, and you said that you have confidence in
19 that because you've done spatial analysis; is that
20 right? 05:21PM

21 A Spatial analysis of where they were sampled
22 and how they were sampled, yes.

23 Q Well, tell me about that spatial analysis.
24 What did you do for each one of the data points that
25 you have plotted in the area that you define as 05:21PM

1 poultry waste dominated or the chemical signature
2 for poultry; what did you do to confirm through your
3 spatial analysis that you have correctly identified
4 those as contaminated by poultry waste?

5 A It's all described in my report but 05:21PM
6 essentially I looked at the locations of those and
7 what type of samples they were.

8 Q How does that --

9 A Whether they were edge of field or not and,
10 you know, whether they were surface water, whether 05:22PM
11 they were high flow stations, whether they were base
12 flow, whether they were high flow, and they were,
13 you know, downgradient of poultry waste application
14 and would be impacted by poultry waste application
15 potentially. 05:22PM

16 Q Dr. Olsen, explain to the court how that
17 analysis that you've just described allows you to
18 identify to a reasonable degree of scientific
19 certainty that the chemical composition in those
20 samples is the product of poultry waste 05:22PM
21 contamination.

22 A That was not the only thing I did. Again,
23 everything is explained in the steps that I went
24 through on how I identified that. The other one was
25 comparing it to chemical compositions of the actual 05:22PM

IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his)
capacity as ATTORNEY GENERAL)
OF THE STATE OF OKLAHOMA and)
OKLAHOMA SECRETARY OF THE)
ENVIRONMENT C. MILES TOLBERT,)
in his capacity as the)
TRUSTEE FOR NATURAL RESOURCES)
FOR THE STATE OF OKLAHOMA,)

Plaintiff,)

vs.)

TYSON FOODS, INC., et al,)

Defendants.)

4:05-CV-00329-TCK-SAJ

- - - - -

VOLUME II OF THE VIDEOTAPED
DEPOSITION OF ROGER OLSEN, PhD, produced as a
witness on behalf of the Defendants in the above
styled and numbered cause, taken on the 11th day of
September, 2008, in the City of Tulsa, County of
Tulsa, State of Oklahoma, before me, Lisa A.
Steinmeyer, a Certified Shorthand Reporter, duly
certified under and by virtue of the laws of the
State of Oklahoma.

1 principal component analysis that we did and talked
2 about -- actually published a paper on it as a
3 result of that. So that was one case. I'm trying
4 to think of other cases. Most other cases have not
5 been related to expert work. There may have been
6 some that I'm forgetting.

08:39AM

7 Q Let me try to simplify it for you, Dr. Olsen.
8 Have you to your knowledge or recollection ever been
9 permitted to explain principal component analysis
10 and how you can identify sources from principal
11 component analysis to a jury?

08:39AM

12 A No.

13 Q You referenced a paper that you wrote. Were
14 you the only author on that paper?

15 A I think a person at the Bureau of Mines and a
16 CDM person were authors on that.

08:39AM

17 Q Who were they? If I'm looking for this paper,
18 what three authors should I look for?

19 A I think it was John Eisenbeis. I think I was
20 the principal author, John Eisenbeis, and I'm trying
21 to remember the Bureau of Mines guy. I think it was
22 Gemperline.

08:40AM

23 Q And in what publication did this paper appear?

24 A It was in the proceedings of conference.

25 Q Well, proceedings in what conference?

08:40AM

1 A I'd have to look that up.

2 Q Was this a peer-reviewed publication?

3 A No.

4 Q Dr. Olsen, have you ever authored a
5 peer-reviewed publication describing the results of
6 a principal component analysis and identifying a
7 source of contamination based upon those results?

08:40AM

8 A No.

9 Q Are you familiar with the peer review process
10 that occurs in connection with publication?

08:41AM

11 A It's different with every journal.

12 Q You understand the idea is to have scientific
13 work reviewed by other competent scientists, who
14 aren't personally involved in the project; as a
15 general matter, you agree with that as a definition
16 for peer review?

08:41AM

17 A Well, you've just stated it yourself. So
18 depends on, you know, the journal and -- but that's
19 overall the purpose of it.

20 Q Okay. With that working definition, Dr.
21 Olsen, have you had your work, your principal
22 component analysis and your interpretation of those
23 results in terms of source peer reviewed in this
24 case?

08:41AM

25 A For publication?

08:41AM

1 surface water that you rely upon in your expert
2 report?

3 A I very specifically say that I only printed
4 out the ones for SW-3 and SW-17, which were the main
5 ones I relied on. 08:58AM

6 Q Okay. So with respect to reference streams,
7 the relevant principal component run would be SW-3;
8 is that right?

9 A Well, there's many other runs that had
10 reference streams in them, but this has reference 08:58AM
11 stream --

12 Q All right. Well, look in SW-3 and maybe you
13 can direct me to those samples, all six of them.

14 A Sure.

15 Q What page are you on, Dr. Olsen? 08:58AM

16 A Oh, I'm just leafing through here.

17 Q Oh, okay. I thought you were ready to mark
18 one.

19 A Well, I don't know if it's easier to look for
20 scores or means. Okay. I'm going down the list. 08:59AM
21 First ones I run into are on Page 8.

22 Q Okay. Can you identify the sample name?

23 A Yeah. It's RBS 10003 and RBS 10004.

24 Q Those are two of the reference streams. Do
25 you know which creek? 08:59AM

1 A I think both of those are Little Lee Creek.

2 Q Okay.

3 A He was supposed to rerun these. For some
4 reason when he did his original printout, they
5 weren't in here, and I redirected him to rerun them. 09:02AM
6 For some reason he cut off the low scores in this
7 printout.

8 Q Who is he?

9 A The person that was doing this was Nathan
10 Smith for me, so -- 09:03AM

11 Q What do you mean he cut off the low scores?

12 A I don't know how he did it because the file he
13 had and the electronic files you have it all in
14 here, and this was supposed to be a sort and a dump,
15 and I caught it the first time and asked him to redo 09:03AM
16 it, and then it went to production and it looks like
17 the previous version went in there. They were
18 included in it, and I can look at the electronic
19 files and tell you exactly where they are.

20 Q Well, let's make a clear Record, Dr. Olsen. 09:03AM
21 Appendix F, which you represented in your report, is
22 a listing of the surface water samples that you used
23 in your principal component analysis, includes only
24 two reference samples; correct?

25 A It's missing a whole bunch of samples for some 09:03AM

1 fingerprint for poultry waste at each of these red
2 dots?

3 A I think there is only one mistake on here.
4 And I need to check it for sure. I think we forgot
5 to drop out the three wastewater treatment samples 09:19AM
6 from here, so I'd have to check that. That's the
7 only difference that I can think of right now.

8 Q With that one exception, you intend to tell
9 the jury, Dr. Olsen, that each of the red dots shown
10 on the map in Figure 6.11-23 show the fingerprint or 09:19AM
11 chemical signature for poultry waste; is that right?

12 A That's right.

13 Q Okay. Now, can you identify the wastewater
14 treatment plant locations that you think need to
15 drop out of this map? 09:19AM

16 A Not without going into detail on these and
17 even seeing if those were in here. There would be
18 three of them.

19 Q I assume, Dr. Olsen, that it is also your
20 expert opinion that the locations that are shaded 09:20AM
21 green on Figure 6.11-23 are locations where the
22 samples do not show the chemical signature or
23 fingerprint for poultry litter; is that right?

24 A Based on the 1.3 criteria. Again, some of
25 those basins did have some poultry in them and 09:20AM

1 waste. I just -- you know, I don't want an
2 incorrect sentence on here. So sorry to interrupt
3 you, but I think you want to start over.

4 Q Let's try it again. Thank you, Dr. Olsen.

5 A I'm sorry. 10:27AM

6 Q You concede, do you not, Dr. Olsen, that the
7 four samples that you identified in your report as
8 potentially contaminated with cattle waste, surface
9 water samples, when you plot them on a PC1 versus
10 PC2 plot, they actually plot within the same area as 10:27AM
11 what you are referring to as poultry waste impacted;
12 correct?

13 MR. PAGE: Object to the form.

14 A They all have scores above 1.3. The important
15 thing is that they plot all over. There isn't a 10:27AM
16 distinct score. There just isn't enough
17 contamination to create a distinct score or there
18 isn't enough leaching to create a distinct score,
19 and that's why, you know, we only have four, and
20 they plot all over the place, so there isn't any 10:28AM
21 grouping or there isn't any distinct signature.

22 Q You can find -- you don't see the same
23 separation and distinct groups for cattle edge of
24 field samples, for example, that you see with
25 respect to cattle manure on Figure 6.11-20C? 10:28AM

1 commissioned on May 2nd of the edge of field samples
2 including the cow pasture samples, did you believe
3 at that time that those edge of field cow pasture
4 samples reflected contamination from cattle as
5 opposed to poultry litter?

11:11AM

6 A Well, they were collected from a cattle field,
7 so that was my first assumption but, you know, after
8 looking at more detailed chemistry, doing these
9 expiration-type analysis, talking to people, seeing
10 the area -- not seeing the area personally but
11 reviewing maps of the area, reviewing springs in the
12 area, reviewing groundwater in the area, how the
13 ponds were -- how the samples were ponded when they
14 were collected, the one was ponded, how near the
15 road, there's certainly an indication that they may
16 not only be contaminated. They may be contaminated
17 with potentially poultry litter.

11:11AM

11:12AM

18 Q Are you speculating about that, Dr. Olsen?

19 A Yes, I am.

20 Q Okay. Do you think it's scientifically
21 legitimate to form an opinion based on speculation?

11:12AM

22 A I said I haven't formed an opinion yet.
23 They're still in question, and I'm still analyzing
24 it and trying to explain why they don't look like
25 the other cow samples. The other cow samples are

11:12AM

1 at Figure 2.8-3, there are -- they're not green dots
2 on this. They are red blocks, and they are
3 identified as RS 630, RS 621, RS 578, RS 580, RS
4 632, and those are all that are comprised within
5 what appear to me to be the city limits of 11:34AM
6 Tahlequah. Then on 6 -- excuse me, 2.8-4, there are
7 additional samples identified as blue dots inside
8 the city limits. They are RS 630, RS 577, RS 578,
9 RS 574, RS 625.

10 Q Okay. Do you have any reason to disagree with 11:35AM
11 what Miss Southerland says; do you read it the same
12 way?

13 A Yes.

14 Q Okay. Dr. Olsen, could you go to the table
15 that reports your Principal Component 1 scores for 11:35AM
16 SW-3?

17 A Yeah. Let me cut you short here now that we
18 brought those up. Those were above 1.3, but based
19 on the spatial analysis, I decided that those were
20 not impacted by poultry, and I colored them green to 11:35AM
21 this analysis of the percent.

22 Q Well, let's go back -- let's make our Record
23 here. Let's go back to SW-3 where those are
24 reported in your table.

25 A Okay. 11:35AM

1 Q And I want you to tell us and tell the court
2 what the PC1 scores are for each of those samples.

3 A Okay. I'm at the SP 3 now. What was the
4 number?

5 Q Let me call them off in order. RBS 574? 11:36AM

6 A RBS --

7 Q What score did you get in your principal
8 component analysis --

9 A I'm still looking.

10 Q -- I'm sorry -- for Principal Component 1. 11:36AM

11 A RBS -- excuse me. What was it again? I'm
12 sorry.

13 Q 574.

14 A What was it? Let me write that down. 170
15 what? 11:37AM

16 Q I'm sorry. I didn't say 170. I'm not sure
17 what you are referring to. 574.

18 A 574, 1.48.

19 Q That's above your 1.3 criteria for impacted by
20 poultry waste; correct? 11:37AM

21 A Yes.

22 Q RBS 577, what's your Principal Component 1
23 score?

24 A 1.4.

25 Q And that is also above your 1.3 criteria for 11:38AM

1 impacted by poultry waste; correct?

2 A That's right.

3 Q RBS 578, what's your Principal Component 1
4 score?

5 A 1.3. 11:38AM

6 Q That sample is also above your 1.3 criteria
7 for predominantly impacted by poultry waste;
8 correct?

9 A Yes.

10 Q Okay. RBS 625, what's the Principal Component 11:38AM
11 1 score?

12 A 625, 1.3.

13 Q That's also above your 1.3 criteria for
14 predominantly impacted by poultry waste; correct?

15 A Yes. 11:38AM

16 Q RBS 630, what's the Principal Component 1
17 score?

18 A 630, 1.6.

19 Q That sample is also above your 1.3 criteria
20 for predominantly impacted by poultry waste; 11:38AM
21 correct?

22 A That's correct, uh-huh.

23 Q RBS 578?

24 A 57 -- RBS --

25 Q Well, I'm sorry. We've already covered that 11:39AM

1 one, Dr. Olsen.

2 A Okay.

3 Q So, Dr. Olsen, these five samples that were

4 collected from surface water in the middle of

5 Tahlequah all scored out above your criteria that 11:39AM

6 you've established as the differentiation between

7 impacted by poultry waste and not impacted by

8 poultry waste; correct?

9 A That's correct, yes.

10 Q And when you look at your map -- can you go 11:39AM

11 back to Figure 6.11-23?

12 A Yes.

13 Q Okay. The map says that all of the green dots

14 on this map have a Principal Component 1 score of

15 less than 1.3; is that right? 11:39AM

16 A Yes.

17 Q Okay. That is not true with respect to

18 Tahlequah, is it?

19 A For these samples, I made a subjective

20 analysis to color them green, that they're not 11:39AM

21 impacted.

22 Q So, Dr. Olsen, when you had the map put

23 together, if you had followed the representation on

24 your map, those samples would be red; correct?

25 A Yes. 11:40AM

1 Q Why did you misrepresent those samples?

2 MR. PAGE: Object to the form.

3 A I didn't. I made a subjective decision that
4 these -- based on the spatial analysis, that these
5 probably weren't impacted by poultry waste because 11:40AM
6 of the spatial analysis, and I should have footnoted
7 that on there or discussed it in the text.

8 Q There's nothing on the face of this figure
9 that would allow the reader to have determined that
10 the green dot that you put on Tahlequah should 11:40AM
11 actually be a red dot, is there?

12 A Not by what's in the legend. That's my fault.

13 Q Okay. This map is misleading in that regard,
14 is it not?

15 A I should have discussed that, yes. 11:40AM

16 Q Okay. Dr. Olsen, did it trouble you that you
17 found the, quote, fingerprint for poultry litter in
18 downtown Tahlequah?

19 A I don't know where those samples are. I
20 always needed to follow up on exactly how those were 11:41AM
21 collected, you know, what they represent and, again,
22 they were very close to the 1.3 cutoff, so anything
23 on that line I made a subjective analysis of whether
24 it was actually poultry or not, tried to keep with
25 the 1.3, though, but things on both sides I looked 11:41AM

1 results files where we actually calculated and went
2 through and counted it. I don't know if I put a
3 summary of that in here or not in one of the tables.
4 I think that summary is in here. If we go to table
5 -- well, here's why I need the tables. I think it's
6 in the set we have so we don't have to slow down
7 here. It's in the tables before here that list each
8 of the variables in the percent completed. So we've
9 tabulated that and, you know, I'd like to look at it
10 to answer your questions if you are going to ask
11 questions about it.

11:50AM

11:50AM

12 Q I won't waste our time going to that table.
13 It may take us longer to find it. How did you deal
14 with missing data in your analysis?

15 A For what purpose?

11:51AM

16 Q Well, let me back up. Sysstat, in order for
17 it to calculate a principal component score, has to
18 have a value for each sample for each of the 26
19 parameters; is that right?

20 A That's right.

11:51AM

21 Q Okay. It will not compute a score when there
22 are holes in the database; correct?

23 A That's correct.

24 Q All right. So how did you fill the holes?

25 A It's essentially was -- it's described in

11:51AM

1 there. I want to get it right, but essentially it
2 wasn't considered. We set it up in Excel that it
3 could take the values and it was missing a value.
4 It just didn't use it in creating a PC1 score, and
5 then we -- to verify, we still got valid PC1 scores, 11:51AM
6 and the overall conclusions are right. We did some
7 PC runs that only used samples that had 100 percent
8 completed, so we got the same overall type analysis.
9 So by having a few missing data points and, again,
10 you can see we were obvious of what we did and what 11:52AM
11 the threshold were. In this case we had to have 20
12 out of 26 in most of these runs. In some of the
13 runs we had to have all of them, and when I say 20
14 out of 26, you know, I have tabulated how many of
15 those samples had 25, how many had 24, so forth. So 11:52AM
16 that was our criteria and that was based on some
17 sensitivity runs where we only did runs with PC
18 scores that had the complete dataset and essentially
19 we didn't see any changes in the conclusions on the
20 fields and the plots and things like this, so we 11:52AM
21 decided to go ahead and use the 20 out of 26 so that
22 we could include the maximum number of samples in
23 our analysis.

24 Q Why didn't you use 15 out of 26?

25 A Again, one of the -- it says right in here, 11:53AM

1 without that hole.

2 Q Well, let me back up. I thought you told me a
3 moment ago that Sysstat will not compute scores
4 based upon samples that have holes; is that right?

5 A Well, but you didn't listen to what I said. I 11:56AM
6 said in Excel we substituted and calculated a score.

7 Remember, we were calculating scores in Excel. We
8 were taking those values, those coefficients from
9 Sysstat, and we were rescaling and recalculating,
10 and at that point anything that didn't have a value 11:56AM
11 was not added up. You know, it's the coefficient
12 times the concentration, coefficient times the
13 concentration, coefficient times the concentration.

14 So when it saw a blank concentration, there was
15 essentially nothing there. So it's like a variance 11:56AM
16 of -- the mean variance is what that would mean it
17 considered it as, but it didn't count it in the
18 score. So essentially you could also look at it as
19 a conservative score, too, because it had less
20 parameter to score. So if you would have had all 26 11:57AM
21 parameters, it probably would have potentially had a
22 higher score.

23 Q All your samples could have potentially had a
24 higher score, not just those that are related to
25 poultry litter; right? 11:57AM

1 track of all the other ones we did.

2 Q Was it hundreds of runs?

3 A Including the runs we did for the preliminary

4 injunction, there was probably over a hundred runs.

5 The ones that we did were the final report. You 02:26PM

6 know, if I had to venture a guess, you know, it may

7 have been -- it's kind of hard to remember all

8 together, but it wasn't near that many, you know.

9 It would have been maybe 50 or so or 20 or 40,

10 somewhere in that, not 20 but more like 50 probably. 02:26PM

11 Q Before you ran your very first PCA run, did

12 you have a criteria to know when you were finished

13 with your PCA analysis?

14 A Are you going back like last year?

15 Q Before you ran the first one for any reason, 02:26PM

16 did you have an objective set of criteria that says

17 when we have done this, this or this, that will tell

18 us we have completed our PCA analysis and we have

19 completed all the PCA runs we need to make?

20 MR. PAGE: Object to the form. 02:27PM

21 A No, I don't remember writing anything down

22 like that definitive.

23 Q Then how did you decide when to stop?

24 A We did all the preliminary analysis for

25 preliminary injunctions and that gave us a good idea 02:27PM

1 think related to the metals being mobilized with the
2 organic carbon and staying in solution and not being
3 attenuated.

4 So your question was how many of these are
5 conservative. Potassium, TS, two, magnesium, three, 05:29PM
6 most of the phosphorus, four, five, six, a little
7 attenuation there. So in my opinion, there's five
8 or six that are very conservative but not -- you can
9 never say anything is an exact conservative element,
10 and the rest of them, you know, have some 05:29PM
11 attenuation but in my opinion not to affect the
12 overall evaluation of their transport throughout the
13 basin.

14 Q In fact, your principal component analysis
15 assumes that they're all conservative, doesn't it? 05:29PM

16 A No.

17 Q Specifically how did you account for the
18 differences in fate and transport via surface water
19 pathways as compared, for instance, to groundwater
20 pathways? 05:30PM

21 A I didn't have to in the principal component
22 analysis. It gives me a chemical analysis at a
23 particular spot, and if I still see the constituents
24 and it has a particular score, then it's impacted.
25 It can be certainly, as we talked about this 05:30PM

1 morning, diluted. It can be attenuated, but as long
2 as they're still there, it doesn't matter. So it's
3 a conservative, maybe considered conservative, but
4 we're looking at individual samples and individual
5 locations and see what we have there, so you don't
6 have to account for the fate and transport.

05:30PM

7 Q Now, from what I've heard, your testimony
8 primarily with Mr. George, to look at how this --
9 your poultry fingerprint primarily described on
10 Figure 6.11-18C where you've drawn the two areas,
11 you have cattle, edge of field samples that show
12 up -- I know they're not on this chart but they show
13 up within the poultry signature. You've got water,
14 residence water wells that show up in the sewage
15 signature. You've got Tahlequah samples where
16 there's no poultry that show up as poultry impacted.
17 Did it ever occur to you, Dr. Olsen, that the
18 problem is not in the watershed, it is that your
19 fingerprinting methodology is flawed?

05:31PM

05:31PM

20 A Those are anomalies that we try to explain,
21 and there's always going to be some minor anomalies
22 in my opinion. Those are minor for the hundreds and
23 hundreds of samples that we have in the whole
24 analysis. So I don't think the analysis is flawed
25 at all.

05:32PM

05:32PM